

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for efficient frontier supplementation in multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem~~analysis~~, the method comprising:

- ~~performing a first multi-objective optimization process, based on competing objectives, to generate an efficient frontier of possible solutions;~~
- generating a non-dominated solution set comprising a first efficient frontier in a portfolio performance space having at least three-dimensions using one of an evolutionary algorithm and optimization processing by using a computing device;
- ~~observing the generated efficient frontier;~~
- ~~based on the observing, identifying an area of at least one region having a gap in the at least three-dimensions of the first efficient frontier using a visualization tool in which there is a gap;~~
- interactively placing at least one target in the at least one region using the visualization tool; and
- ~~effecting a gap-filling process by which the efficient frontier is supplemented in the area of the gap, the efficient frontier being used in investment decisioning;~~
- generating supplemental solutions to the first efficient frontier using a Target Objectives Genetic Algorithm (TOGA) to create a second efficient frontier, the second efficient frontier being used in investment decisions.

2-4. (Canceled)

5. (Currently Amended) The method of claim 1, further including the step of wherein the selecting at least one portfolio from the ~~generated second~~ efficient frontier, includes:

~~—selecting the at least one portfolio in the area that was filled in by the gap filling process;~~

6. (Currently Amended) The method of claim 1, wherein the effecting the gap filling process by which the efficient frontier is filled in the area of the gap TOGA further including includes the steps of:

providing-accepting a set of target vectors; and

generating a series of chromosomes, evaluated on the basis of the accepted target vectors, over multiple generations.

7. (Currently Amended) The method of claim 6, wherein the ~~method TOGA~~ further includes the step of evaluating the a fitness of each chromosome until a population with an acceptable fitness is determined so as to fill in the identified gap.

8-12. (Canceled)

13. (Currently Amended) The method of claim 1, wherein the gap is ~~an area a~~ region that is sparsely populated by possible solutions.

14. (Canceled)

15. (Currently Amended) A system for efficient frontier supplementation in multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem analysis, the system comprising:

an efficient frontier generation portion that generates a non-dominated solution set comprising a first efficient frontier in a portfolio performance space having at least three-dimensions using one of an evolutionary algorithm and optimization processing; performs a first multi-objective optimization process, based on competing objectives, to generate an efficient frontier of possible solutions;

a visualization tool by which a user identifies at least one region having a gap in the at least three-dimensions of the first efficient frontier and interactively places at least one target in the at least one region; observes the generated efficient frontier, based

on the observing, the user identifying an area of the efficient frontier in which there is a gap; and

a gap filling portion that generates supplemental solutions to the first efficient frontier using a Target Objectives Genetic Algorithm (TOGA) to create a second efficient frontier, the second efficient frontier being used in investment decisions, the gap filling portion effecting a gap filling process by which the efficient frontier is supplemented in the area of the gap, the supplemented efficient frontier being used in investment decisioning.

16-18. (Canceled)

19. (Currently Amended) The system of claim 15, wherein the gap filling portion selecting-selects at least one portfolio from the generated-second efficient frontier, includes:

— selecting the at least one portfolio in the area that was filled in by the gap filling process.

20. (Currently Amended) The system of claim 15, wherein the effecting the gap filling process by which the efficient frontier is filled in the area of the gap TOGA further includingincludes:

providing-accepting a set of target vectors; and

generating a series of chromosomes, based on the accepted target vectors, over multiple generations.

21. (Currently Amended) The system of claim 20, wherein the system-TOGA further includes evaluating the-a fitness of each chromosome until a population with an acceptable fitness is determined so as to fill in the identified gap.

22. (Canceled)

23. (Currently Amended) A computer readable medium for efficient frontier supplementation in multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problemanalysis, the computer readable medium comprising:

a first portion that generates a non-dominated solution set comprising a first efficient frontier in a portfolio performance space having at least three-dimensions

using one of an evolutionary algorithm and optimization processing; performs a first multi-objective optimization process, based on competing objectives, to generate an efficient frontier of possible solutions;

a visualization tool by which a user identifies at least one region having a gap in the at least three-dimensions of the first efficient frontier and interactively places at least one target in the at least one region; observes the generated efficient frontier, based on the observing, the user identifying an area of the efficient frontier in which there is a gap; and

a second portion that generates supplemental solutions to the first efficient frontier using a Target Objectives Genetic Algorithm (TOGA) to create a second efficient frontier, the second efficient frontier being used in investment decisions, the second portion effecting a gap filling process by which the efficient frontier is supplemented in the area of the gap, the supplemented efficient frontier being used in investment decisioning.

24. (Canceled)